

SWBAT: identify misconceptions about current and define resistance

Jan 4-7:20 AM

Welcome!!!

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SECA Physics
Thursday 26 February 2015

* Pick up:

- 2 slips of paper (1 for later)
- get your yellow concept sheet from the slot
- whiteboard, marker, eraser



Opening Question (on 1 slip of paper):

What is most confusing about this electricity stuff?

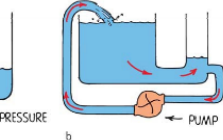
ELECTRONS: NEGATIVE PARTS
OF ATOMS

CHARGE = \downarrow POSITIVE ^{Centering}

ELECTRICITY = CHARGES FLOW

Sep 7-7:04 AM

Pressure



b

t: 6 rows total

An electron is $1.6 \times 10^{-19} \text{ C} = .000000000000000000016 \text{ C}$

Meaning	Symbol	Units	Analogy
CHARGE PROPERTY OF PROTONS & ELECTRONS THAT CAUSES ATTRACTION & REPULSION	q	COULOMBS C	MEASURE WATER THE WATER ITSELF
VOLTAGE = ELECTRIC POTENTIAL POTENTIAL BASED ON POSITION IN AN ELECTRIC FIELD "PUSH"	V	VOLTS V $V = \frac{J}{C}$	PUMP WATER PRESSURE UP HIGH
CURRENT THE FLOW OF ELECTRIC CHARGE $= \frac{\text{CHARGE}}{\text{TIME}}$	I $I = \frac{q}{t}$	AMPERE A $1A = \frac{C}{s}$	FLOW OF WATER $\frac{q}{I \cdot t}$

Feb 23-7:34 AM

Electrons in a wire demo

How many protons in the wire?

8

How many electrons in the wire?

8

Is the wire positive, negative, or neutral? (+, -, or 0)

0

How many electrons are in the wire while / after current flows?

8

What charge is the wire now? (+, -, or 0)

0

T/F: The electron that got pushed in is the one that came out

False

T/F: Something came out of the wire as soon as something went in (The flow was fast)

True

T/F: The electrons inside moved super fast, raced from one end of the tube to the other.

False

Feb 28-7:46 AM

"Current" misconceptions...

TRUE

METAL IS ALWAYS
PROTONS & ELECTRONSFLOW IS SUPER
FAST, \bar{e} ARE SLOW

3) Wires are neutral when

a current is flowing

through them $\bar{e}_{IN} = \bar{e}_{OUT}$

FALSE

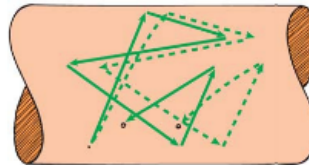
1) Wires are empty of
electrons and filled up
when there's a current

2) Electrons flow super fast

3) WIRES ARE
NEGATIVE

FIGURE 34.14

The solid lines depict a random path of an electron bouncing off atoms in a conductor. The dashed lines show an exaggerated view of how this path changes when an electric field is applied. The electron drifts toward the right with an average speed less than a snail's pace.



Feb 23-7:43 AM

Concept sheet: 6 rows total

Concept	Meaning	Symbol	Units	Analogy	Bike
CHARGE	PROPERTY OF PROTONS & ELECTRONS THAT CAUSES ATTRACTION & REPULSION	q	COULOMBS C		
VOLTAGE = ELECTRIC POTENTIAL	POTENTIAL BASED ON POSITION IN AN ELECTRIC FIELD "PUSH"	V	VOLTS V $V = \frac{1J}{1C}$		
CURRENT	THE FLOW OF ELECTRIC CHARGE $= \frac{CHARGE}{TIME}$	I $I = \frac{q}{t}$	AMPERE A $1A = \frac{1C}{s}$		$\frac{q}{I \cdot t}$
RESISTANCE	THE OPPOSITION OF CURRENT "AGAINST THE FLOW"	R	OHMS Ω		

Feb 23-7:34 AM

Current, Voltage, and Resistance: The Bicycle Analogy

If I were to pedal a bike while gently squeezing the hand brakes, what in that situation would be like
current?
voltage?
resistance?

V: PEDALER/LEGS/HUMAN

I: MOVING
- PEDDLING
- CHAIN

R: BRAKES



Mar 7-7:33 AM

BASE LEVEL

BASE LEVEL

BASE SPEED

Pedaling Effort	Braking	Speed of bike?
Same	More	
Same	Less	
More	Same	
Less	Same	

Feb 23-7:43 AM

Daily 3 Questions

- * Every day except test/project days
- * 3 Questions on the topics of the day
- * Main source of daily points
- * I am happy to give credit when I have no concerns about someone giving or getting help with the answers.

You can't get your points if you don't have your **NAME!!!**

Name	Period
1.	
2.	
3.	

Sep 9-7:32 AM

1. True or False: **Wires become negatively charged** by the electrons pumped into them when they have a current flowing through them.

2. Resistance is defined as the opposition of _____.

3. In our bike analogy, the brakes are like
A. current
B. voltage
C. resistance

Feb 18-6:59 AM